



## Redescription and new records of a poorly known leucosiid crab, *Pseudophilyra punctulata* Chen & Ng, 2003, and description of a new species of *Pseudophilyra* from Japan (Crustacea: Decapoda: Brachyura)

TOMOYUKI KOMAI<sup>1,4</sup>, MIHO SHIMETSUGU<sup>2</sup> & PETER K.L. NG<sup>3</sup>

<sup>1</sup>Natural History Museum and Institute, Chiba, 955-2 Aoba-cho, Chuo-ku, Chiba, 260-8682 Japan. E-mail: [komai@chiba-muse.or.jp](mailto:komai@chiba-muse.or.jp)

<sup>2</sup>560-14 Ueno, Kawage-cho, Tsu, Mie, 510-0304 Japan. E-mail: [ttqapv4h@zc.ztv.ne.jp](mailto:ttqapv4h@zc.ztv.ne.jp)

<sup>3</sup>Lee Kong Chian Natural History Museum, Faculty of Science, National University of Singapore, 2 Conservatory Drive, Singapore 117377, Republic of Singapore. E-mail: [peterng@nus.edu.sg](mailto:peterng@nus.edu.sg)

<sup>4</sup>Corresponding author

### Abstract

A poorly known leucosiid crab, *Pseudophilyra punctulata* Chen & Ng, 2003, originally described on the basis of an immature male holotype and an immature female paratype from Singapore, is rediscovered and rediagnosed on the basis of material from Thailand, the Philippines and the Ryukyu Islands (Japan). In addition, a new species closely related to *P. punctulata*, *P. parilis*, is described and illustrated on the basis of material from Mie Prefecture, Honshu mainland of Japan. The new species is distinguished from *P. punctulata* by the coarser granules bordering the lateral carapace margins and the different shape of the gonopods. *Pseudophilyra tridentata* Miers, 1879, is also compared with *P. punctulata* and *P. parilis* n. sp. because of the close similarities in the overall morphology of the carapace and appendages, but can easily be differentiated by the smoother carapace and thoracic sternum surface, different shape of the carapace and the stouter cheliped palm. It is possible that previous records of *P. tridentata* outside Japan might contain more than one species.

**Key words:** *Pseudophilyra parilis*, *Pseudophilyra tridentata*, Thailand, Philippines, Ryukyu Islands

### Introduction

The leucosiid crab genus *Pseudophilyra* Miers, 1879, is currently represented by 14 species, all distributed in the Indo-West Pacific (Table 1). Two taxa originally assigned to *Pseudophilyra*, viz., *P. hoedtii* De Man, 1881, and *P. dinops* Takeda, 1977, were relegated to the synonymy of *Seulocia pubescens* (Miers, 1877) (cf. Davie 2009) and *P. tridentata* Miers, 1879 (cf. Komatsu & Takeda 2000), respectively. The genus is characterized by the possession of a median tooth on the carapace frontal margin, the lack of an anterolateral facet and thoracic sinus on the carapace, and the presence of pearly granules at least partially covering the surfaces of the cheliped merus.

Chen & Ng (2003) described four new species of leucosiid crabs from Singapore, amongst them *Pseudophilyra punctulata*, described on the basis of one immature holotype male and one immature paratype female (Fig. 1). The original description is relatively brief, without information on the male gonopods. Since the original description, there have been no additional records of the species. Examination of leucosiid specimens in the collection of the Natural History Museum and Institute, Chiba, Japan (CBM), and Zoological Reference Collection of the Lee Kong Chian Natural History Museum, National University of Singapore (ZRC), has revealed the presence of this poorly known species in Thailand, the Philippines and the Ryukyu Islands (Japan). On the basis of the newly collected specimens, as well as the two type specimens, we redescribe *P. punctulata*. In particular, a single fully mature male specimen from Phuket, Thailand, enables us to diagnose the species more precisely, although Chen & Ng (2003) has already discussed that *P. punctulata* closely resembles *P. intermedia* Ihle, 1918, and *P. tridentata* Miers, 1879. Furthermore, after comparison with the material of *P. punctulata*, it was found that material from Mie and Wakayama Prefectures, Japan, collected by the second author (MS) and her colleagues,

**TABLE 1.** List of species of *Pseudophilyra* Miers, 1879 with information on the G1 morphology and distribution.

Species	G1 morphology	Distribution	References
<i>Pseudophilyra albimaculata</i> Chen & Sun, 2002	Chen & Sun (2002)	Guangdong, China	Chen & Sun (2002)
<i>Pseudophilyra blandfordi</i> Alcock, 1896	Stephensen (1946)	Gulf of Oman; Iran; Pakistan	Alcock (1896); Stephensen (1946); Apel (2001)
<i>Pseudophilyra burmensis</i> Sakai, 1983	Sakai (1983)	Rangoon, Myanmar	Sakai (1983)
<i>Pseudophilyra deficiens</i> Ihle, 1918	Not known	Banda, Indonesia; 9–36 m	Ihle (1918)
<i>Pseudophilyra intermedia</i> Ihle, 1918	Komatsu & Takeda (2000)	Banda, Indonesia; Japan; Taiwan; 9–48 m	Ihle (1918); Sakai (1937; 1976; as <i>P. tridentata</i> ); Komatsu & Takeda (2000); Shih et al. (2013); Ng et al. (2017)
<i>Pseudophilyra melita</i> De Man, 1888	Stephensen (1946)	Persian Gulf; India; Mergui Archipelago; Thailand; South China Sea	De Man (1888); Henderson (1893); Alcock (1896); Stephensen (1946)
<i>Pseudophilyra nanshaensis</i> Chen, 1996	Chen & Sun (2002)	Nansha Islands, South China Sea; 97 m	Chen (1996); Chen & Sun (2002)
<i>Pseudophilyra parilis</i> <b>n. sp.</b>	This study	Japan (Mie and Wakayama Prefectures); intertidal	This study
<i>Pseudophilyra perryi</i> (Miers, 1876)	Not known	Western Australia; subtidal	Miers (1876); Davie (2002)
<i>Pseudophilyra polita</i> Miers, 1884	Not known	Poivre Island, Seychelles; 23–36 m	Miers (1884)
<i>Pseudophilyra punctulata</i> Chen & Ng, 2003	This study	Singapore; Phuket, Thailand; Ryukyu Islands, Japan; intertidal	Chen & Ng (2003); this study
<i>Pseudophilyra pusilla</i> Henderson, 1893	Not known	Gulf of Marthaban, India	Henderson (1893)
<i>Pseudophilyra tenuipes</i> Ihle, 1918	Not known	Kei Island, Indonesia; Queensland, Australia; 16–22 m	Ihle (1918); McNeil (1968)
<i>Pseudophilyra tridentata</i> Miers, 1879	Stephensen (1946); Tyndale-Biscoe & George (1962)	Red Sea; Persian Gulf; Gulf of Manaar, India; Australia; Gulf of Thailand; Japan; 7–68 m	Miers (1879); Alcock (1896); Calman (1900); Laurie (1906); Rathbun (1910); Balss (1916; 1922); Stephensen (1946); Tyndale-Biscoe & George (1962); Campbell & Stephenson (1970); Takeda (1977; as <i>P. dinops</i> Takeda, 1977); Komatsu & Takeda (2000)
<i>Pseudophilyra woodmasoni</i> Alcock, 1896	Chen & Sun (2002); Komatsu et al. (2004)	Cape Comorin, India; Andaman Sea; Sulu, Philippines; Indonesia; South China Sea; 15–70 m	Alcock (1896); Ihle (1918); Chen & Sun (2002); Komatsu et al. (2004)

represents an undescribed species closely allied to *P. punctulata*, herein described as *P. parilis* **n. sp.** Comments on the taxonomy of *P. tridentata* are also provided.

## Material and methods

Material used in this study is deposited in CBM and ZRC. Measurements, given in millimeters (mm), are of the greatest carapace length (including the frontal median tooth) and width, respectively.

For comparison, the following specimens were examined:

*Pseudophilyra intermedia*: CBM-ZC 4241, 1 male (7.9×6.8 mm), off Sabiura, Kushimoto, Wakayama Prefecture, 42 m, 25 June 1979, dredge, coll. S. Yamaguchi; CBM-ZC 7267, 2 males (7.5×6.7 mm, 8.0×6.9 mm), 1 female (10.0×9.1 mm), TRV “Toyoshio-maru”, 1997-05 cruise, stn 7, W of Tanegashima Island, 30°45.00’N, 130°55.00’E, 47 m, sand, 29 May 1997, dredge, coll. T. Komai; CBM-ZC 9946, 1 male (4.7×4.1 mm), Kouyatsu, Tateyama, Chiba Prefecture, 34°58.48’N, 139°49.10’E, 12–13 m, sand with sea grass, 22 March 2008, dredge, coll. T. Komai; CBM-ZC 12537, 1 male (8.5×7.3 mm), TRV “Toyoshio-maru”, 2001-06 cruise, stn 4, W of Tanegashima Island, 30°33.50’N, 130°53.30’E, 47 m, 26 May 2001, dredge, coll. T. Komai.

*Pseudophilyra tridentata*: CBM-ZC 7846, 1 immature male (6.1×5.3 mm), 1 female (8.1×7.2 mm, 11.4×9.7 mm), TRV “Toyoshio-maru” 1998-4 cruise, stn 11-2, S of Nagannu Island, Okinawa Islands, 26°14.50’N, 127°32.00’E, 53 m, sand, 20 May 1998, dredge, coll. T. Komai; CBM-ZC 8827, 1 immature male (5.3×5.9 mm), TRV “Toyoshio-maru” 1994-25 cruise, stn 17, W of Tanegashima Island, 30°38.95’N, 130°52.08’E, 45 m, 11 November 1994, dredge, coll. E. Tsuchida.

## Taxonomic account

### Leucosiidae Samouelle, 1819

### Ebaliinae Stimpson, 1871

### *Pseudophilyra* Miers, 1879

### *Pseudophilyra punctulata* Chen & Ng, 2003

[New Japanese name: Minami-kobushi-modoki]

(Figs. 1–4)

*Pseudophilyra punctulata* Chen & Ng, 2003: 64, figs. 1A, 2 (type locality: Siloso Beach, Sentosa, Singapore).

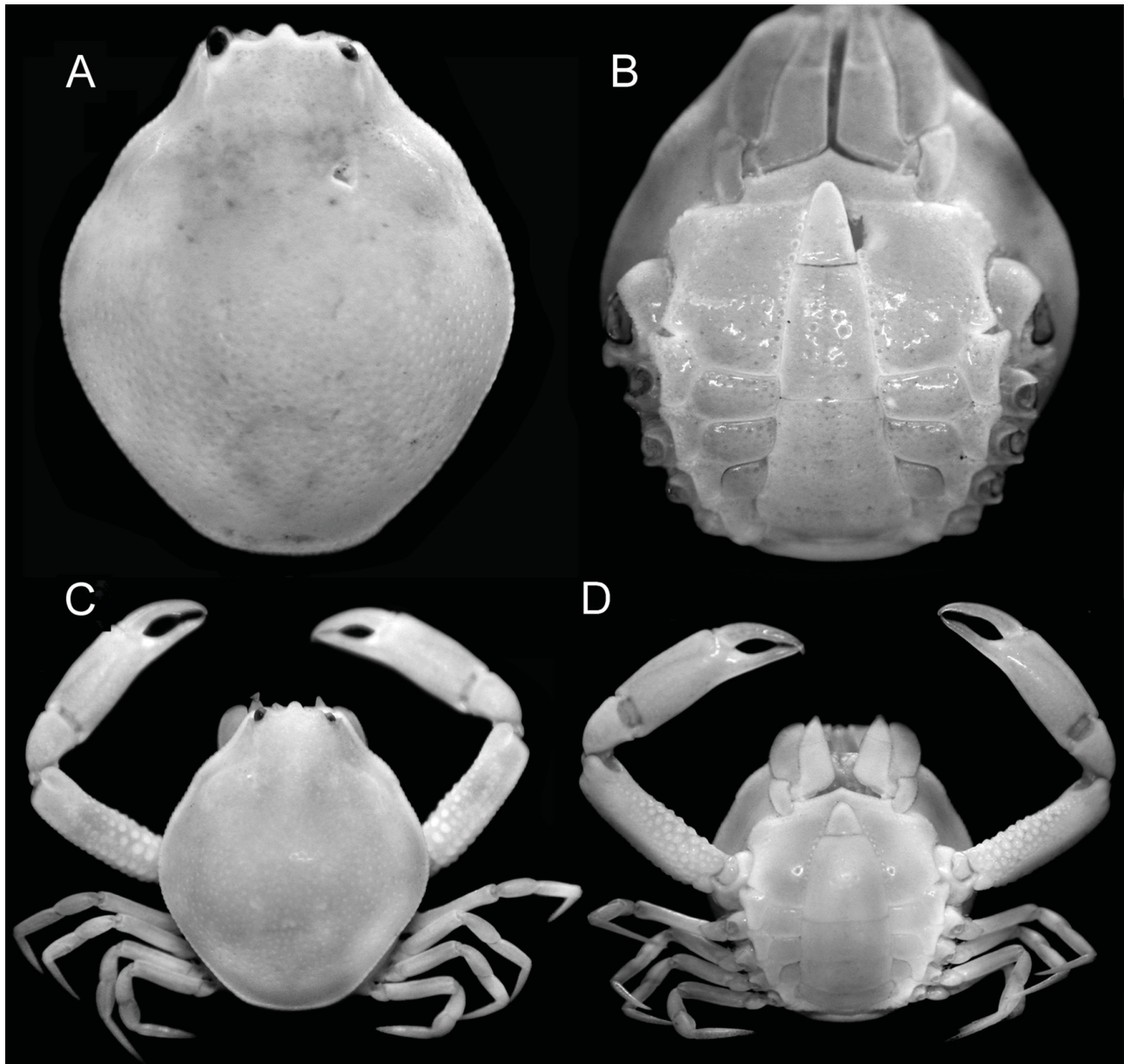
*Pseudophilyra punctata* (sic).—Ng *et al.* 2008: 93 (list; no new locality).

**Material examined.** Holotype: ZRC 1993.92, immature male (5.8×5.0 mm), Siloso Beach, Sentosa, Singapore, coll. P.K.L. Ng & S.L. Tay, 21 December 1987.

Paratype: ZRC 1995.550, 1 immature female (6.0×5.4 mm), Changi Point, Singapore, coll. E. Low, 1 August 1992. Others: **Japan**: CBM-ZC 7024, 1 immature male (6.1×5.3 mm), 1 female (8.2×7.4 mm), Uehara, Iriomote Island, Yaeyama Islands, Ryukyu Islands, subtidal sea grass beds, 8 July 2001, dip net, coll. T. Komai; CBM-ZC 7074, 1 female (8.7×7.7 mm), same data; CBM-ZC 7053, 1 female (8.2×7.4 mm), Shiraho, Ishigaki Island, Yaeyama Islands, subtidal sea grass beds, 1 July 2001, dip net, coll. T. Komai. **Philippines**: ZRC 2018.0257, 1 immature male (4.4×5.2 mm), station S11, in fine sand and seagrass bed, lagoon off Poblacion, 2 m, Panglao, Bohol, Visayas, 09°33.6’N 123°43.6’E, 11 June 2004, coll. Panglao Marine Biodiversity Project 2004. **Thailand**: CBM-ZC 12912, 1 male (6.7×6.0 mm), Ao Tang Khen, Phuket, intertidal, sand flat with sea grass beds, 5 October 1990, coll. T. Komai; CBM-ZC 8323, 2 immature males (4.4×3.9 mm, 4.6×4.1 mm), 2 immature females (4.6×4.2 mm, 4.9×4.4 mm), same locality, 24 October 1995, coll. T. Komai.

**Redescription.** *Adult male*. Carapace (Figs. 2, 3A) subpyriform in general outline, 1.12 times longer than broad; dorsal surface convex, glabrous, but coarsely punctate. Front (Fig. 3) weakly produced anteriorly, anterior

margin trilobate, median lobe subtriangular with rounded apex projecting anteriorly, distinctly exceeding lateral teeth; lateral lobe (inner orbital lobe) blunt, not particularly produced. Orbits small; supraorbital margin strongly oblique, with short, blunt lateral tooth demarcated mesially by deep, narrow longitudinal suture; bilobed anterior margin of efferent branchial channel forming lower orbital margin, inner angle acutely pointed. Hepatic region slightly inflated, forming low, dome-like elevation. Mesogastric region with obsolescent median ridge, shallowly depressed on both sides of ridge. Lateral to posterior margins keel-like, bordered with relatively coarse granules (Fig. 3C), with low convexity just below hepatic region (pterygostomial margin); posterior margin bi-keeled, both nearly straight.



**FIGURE 1.** *Pseudophilyra punctulata* Chen & Ng, 2003, type specimens. A, ZRC 1993.92, holotype, immature male (5.8×5.0 mm), Singapore, carapace in dorsal view (pereopods all detached); B, same, thoracic sternum and pleon in ventral view; C, ZRC 1995.550, paratype, immature female (6.0×5.4 mm), Singapore, habitus in dorsal view; D, same, habitus in ventral view.

Eyestalks (Fig. 3A) retractable, subcylindrical, mesial side protruding into minute blunt distal tubercle exceeding cornea. Antennular fossa continuous with orbit, partially sealed by basal plate on antennule; antennules folded slightly obliquely within fossa. Antenna very small, inserted between antennular fossa and orbit.

Thoracic sternum glabrous. Sternite 3 (Fig. 3D) subtriangular, anterior margin produced anteriorly, surface slightly depressed medially. Sternite 4 (Fig. 3D) largest, anterior and lateral margins coarsely granular, otherwise



weakly granular with scattered minute punctae. Sternites 5–8 becoming smaller toward posterior, surfaces generally smooth but with few punctae. Episternite 4 partially fused with sternite 4; episternites 5–8 each with shallowly concave outer margin. Sternopleonal cavity deep, extending onto posterior part of thoracic sternite 3, margins on sternite 4, corresponding to pleomere 6 and telson, bordered with coarse granules (Fig. 3D).

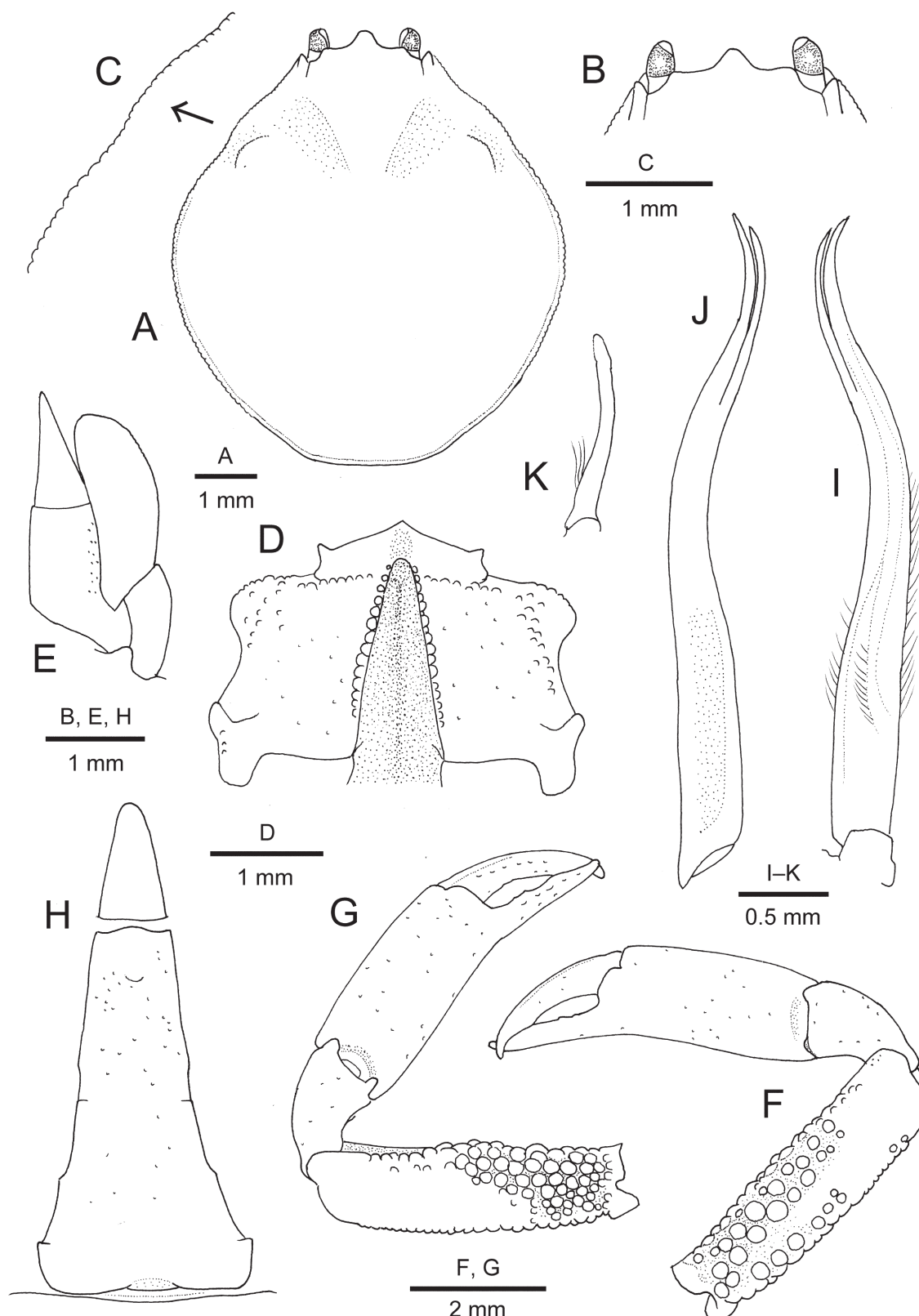
Maxilliped 3 (Fig. 3E) almost flat, smooth, polished on outer surface. Ischium subrectangular, distinctly longer than wide; merus triangular, tapering distally to subacute tip, subequal in length to ischium measured along mesial margin; lateral margin of ischium and merus minutely beaded. Exopod with distal article spatuliform, lateral margin minutely beaded.

Chelipeds (Figs. 2, 3F, G) symmetrical, 1.4 times as long as carapace, glabrous. Merus subcylindrical, about 3.3 times as long as wide, covered with pearly granules of various sizes except for distal one-third of upper surface and distal two-thirds of lower surfaces where granules almost absent. Carpus short, cup-shaped, inner surface concave; upper inner margin with row of small granules, but otherwise almost smooth. Palm compressed, 2.0 times as long as wide, slightly arcuate on outer (extensor) margin, inner (flexor) margin slightly sinuous; upper surface almost smooth, lower surface with scattered punctae; fixed finger slightly deflexed, nearly straight, terminating in slightly curved, blunt tip; dactylus 0.8 times as long as palm, terminating in slightly curved, blunt tip; both occlusal margins meeting in distal 0.4 and forming oval hiatus in proximal 0.6, each with few, low teeth proximally.

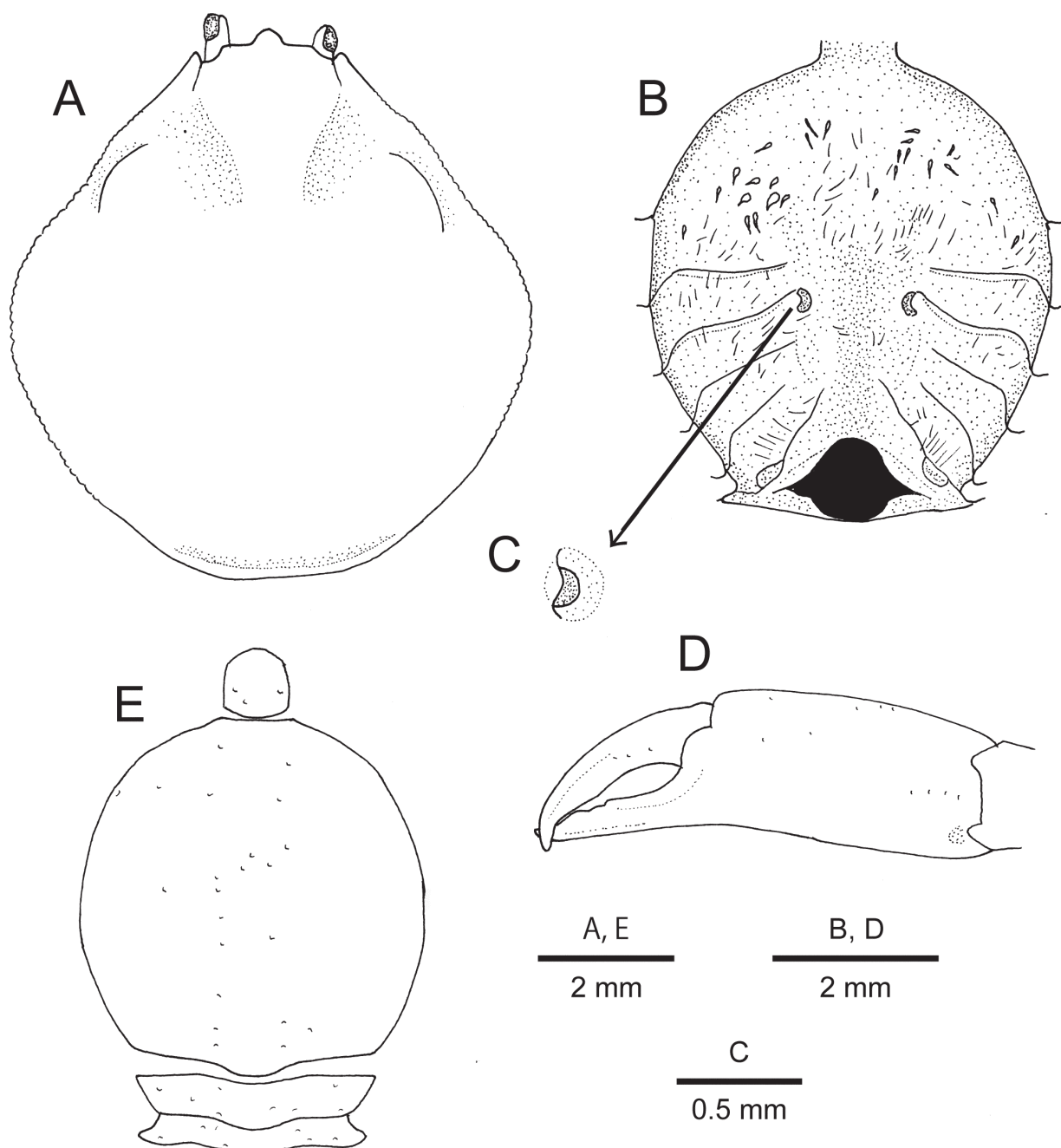
Ambulatory legs (Fig. 2) slender, glabrous, similar in shape, gradually decreasing in length from first to fourth; each merus cylindrical; each carpus as long as or shorter than propodus; propodus somewhat compressed; each dactylus flattened, slightly curved, tapering distally to minute corneous claw, subequal in length to carpus and propodus combined.



**FIGURE 2.** *Pseudophilyra punctulata* Chen & Ng, 2003, CBM-ZC 12912, male (6.7×6.0 mm), Phuket, Thailand, habitus in dorsal view (left pereopod 3 and right pereopods 3 and 5 missing), stained with methylene blue to show details of dorsal ornamentation of carapace.



**FIGURE 3.** *Pseudophilyra punctulata* Chen & Ng, 2003, CBM-ZC 12912, male (6.7×6.0 mm), Phuket, Thailand. A, carapace, dorsal view (dorsal ornamentation omitted); B, front of carapace and eyes, dorsal view; C, left pterygostomial margin of carapace, dorsal view; D, thoracic sternites 3 and 4, including episternites 4, ventral view; E, left maxilliped 3, outer view (setae omitted); F, right cheliped, dorsal view; G, same, ventral view; H, pleon and telson, ventral view; I, left gonopod 1, ventral view; J, same, dorsal view; K, left gonopod 2, lateral view.



**FIGURE 4.** *Pseudophilyra punctulata* Chen & Ng, 2003, CBM-ZC 7053, female (8.2×7.4 mm), Ishigaki Island, Yaeyama Islands, Ryukyu Islands. A, carapace, dorsal view (dorsal ornamentation omitted); B, sternopleonal cavity, ventral view; C, right vulva, ventral view; D, right chela, dorsal view; E, pleon and telson, ventral view.

Pleon (Fig. 3H) elongate-triangular, gently curved sternally. Somites 1 and 2 very short, transversely linear. Main fused section consisting of somites 3–6 elongate trapezoidal, slightly constricted at proximal one third; trace of sutures between somites 3/4 and 5/6 still discernible along lateral margin; surface with scattered punctae. Somite 6 with trace of tubercle somewhat proximal to distal margin. Telson elongate-triangular, 1.7 times as long as wide.

Gonopod 1 (Fig. 3I, J) slender, sinuously curved, gradually tapering, slightly twisted, reaching nearly to suture between thoracic sternites 3/4, deeply bifurcate at distal 0.3; proximal part well calcified, distal branches chitinous; inner branch slightly longer than outer branch, each branch terminating in acute tip. Gonopod 2 (Fig. 3K) 0.4 times as long as gonopod 1, slightly curved; proximal part expanded; distal 0.8 slender, not tapering, tip simple, rounded.

*Immature males.* Generally similar to adult male. Carapace (Fig. 1A) 1.11–1.16 times as long as wide.

*Females.* Carapace (Figs. 1C, 4A) 1.10–1.12 times as long as wide. Front slightly less produced than in males.

Exposed lateral part of thoracic sternum very narrow, smooth, forming outer wall of deeply excavated sternopleonal cavity; sutures between sternites 4/5, 5/6, 6/7 and 7/8 distinct; sternites 1–3 fused, deeply depressed below to accommodate telson. Sternopleonal cavity (Fig. 4B) circular in outline, margins distinctly delimited; sutures between sternites 4/5, 5/6, 6/7, and 7/8 widely interrupted medially; median suture absent; sternite 4 large, occupying anterior half of sternopleonal cavity, with scattered short, occasionally feathered, setae. Vulvae (Fig. 4B, C) small, located just posterior to mesial end of suture between sternites 5/6, outline generally semicircular, outer margin produced toward mesial into rounded lobe.

Cheliped (Fig. 1C, D) slightly slender than that of males; palm (Fig. 4D) 2.0 times as long as wide; occlusal margins of fingers without conspicuous teeth proximal to meeting point.

Pleon of adults (Fig. 4C) broad, dome-like; somites 1 and 2 short, transversely band-shaped, somite 2 about twice longer than somite 1; main fused section (somites 3–6) ovoid, no trace of sutures. Telson small, subsemicircular, exceeding beyond anterior margin of thoracic sternite 3.

**Colour in life.** Not known.

**Distribution and habitat.** Originally described from Singapore; now newly recorded from Phuket (Thailand), Bohol (Philippines) and Yaeyama Islands, Ryukyu Islands (Japan); intertidal to shallow subtidal. Specimens from the Ryukyu Islands and Phuket were collected from intertidal sea grass beds formed on sand flats. The holotype male was collected from sandy intertidal areas at the edge of a coral reef near patches of seagrass.

**Remarks.** As noted above, the type series of *Pseudophilyra punctulata* consists only of two immature specimens (Fig. 1). The holotype is a male, but the gonopods are not fully developed. The paratype is a female, but the pleon is narrowly triangular (Fig. 1D), indicating that it is also immature.

The immature specimens from Phuket (CBM-ZC 8323) and Panglao (ZRC 2018.0257) are very similar to the type specimens. The adult male specimen from Phuket, Thailand (CBM-ZC 12912), collected from the same locality as the four immature specimens (CBM-ZC 8323) enables us to assess adult male characters, including the gonopod 1 morphology. This species characteristically has a deeply bifurcate distal part of the gonopod 1, and this character is also seen in *P. parilis* n. sp. and *P. tridentata* among known congeners (see account of *P. parilis* n. sp.).

Chen & Ng (2003) compared *P. punctulata* mainly with *P. intermedia* but the male gonopod 1 structure is quite different between the two species. In *P. intermedia*, the gonopod 1 is strongly twisted and terminates in a simple, slender process, and is never as deeply bifurcate as in *P. punctulata* (cf. Komatsu & Takeda 2000: fig. 2k). In addition, *P. punctulata* differs from *P. intermedia* in the better developed frontal median tooth of the carapace, and the median tubercle on the male pleomere 6 is reduced to a trace. In male *P. intermedia*, there is a distinct tubercle on the pleomere 6 (cf. Komatsu & Takeda 2000: fig. 4j).

Differentiating characters between *P. punctulata*, *P. tridentata* and *P. parilis* n. sp. are discussed under the account of *P. parilis* n. sp.

### ***Pseudophilyra parilis* n. sp.**

[New Japanese name: Hamabe-kobushi-modoki]

(Figs. 5–8)

**Material examined.** Holotype: CBM-ZC 14485, 1 male (7.2×6.2 mm), Maehama Beach, Funakoshi, Daiou-cho, Shima, Mie Prefecture, 34°16.11'N, 136°52.11'E, intertidal, sand, 23 July 2013, coll. S. Kimura.

Paratype: ZRC 2018.0258, 1 male (6.5×5.6 mm), same data as holotype; ZRC 2018.0259, 1 female (8.1×7.4 mm), 1 immature female (6.0×5.4 mm), same locality, 21 August 2013, coll. S. Kimura; CBM-ZC 14486, 1 male (7.3×6.3 mm), 1 female (7.9×7.3 mm), same locality, 26 August 2017, coll. M. Shimetsugu; CBM-ZC 14487, 1 male (7.0×6.2 mm), 1 female (9.5×8.8 mm), same locality, 8 September 2017, coll. S. Kimura; CBM-ZC 15184, 1 female (7.7×6.9 mm), Saino, Shirahama, Wakayama Prefecture, 33°39.21'N, 135°21.49'E, intertidal, 1 June 2018, coll. S. Kimura.

**Description.** *Holotype male.* Carapace (Figs. 5, 6A) subpyriform in general outline, 1.15 times as long as wide; dorsal surface convex, glabrous, coarsely punctate. Front (Fig. 6B) weakly produced anteriorly, anterior margin trilobate, median lobe subsemicircular, projecting anteriorly, distinctly exceeding lateral teeth; lateral lobe (inner orbital lobe) blunt, not particularly produced. Orbits small; supraorbital margin strongly oblique, with short,



blunt lateral tooth demarcated mesially by deep, narrow longitudinal suture; bilobed anterior margin of efferent branchial channel forming lower orbital margin, inner angle acutely pointed. Hepatic region slightly inflated, forming low, dome-like elevation. Mesogastric region with obsolescent median ridge, shallowly depressed on both sides of ridge. Lateral to posterior margins keel-like, bordered with relatively coarse granules (Fig. 6C), with low convexity just below hepatic region (pterygostomial margin); posterior margin bi-keeled, both nearly straight.

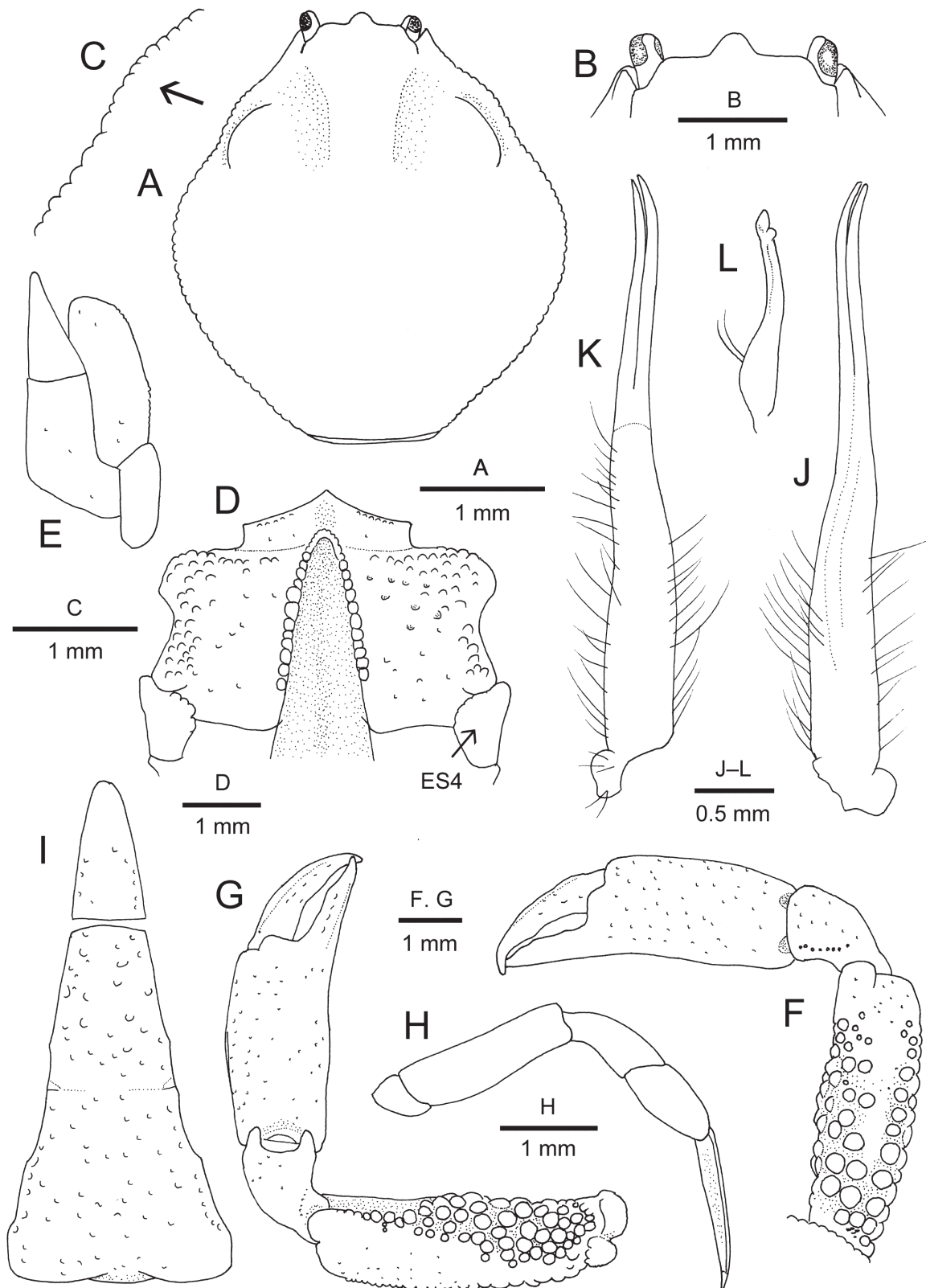
Eyestalks (Fig. 6B) retractable, subcylindrical, mesial side protruding into minute blunt distal tubercle exceeding cornea. Antennular fossa continuous with orbit, partially sealed by basal plate on antennule; antennules folded slightly obliquely within fossa. Antenna very small, inserted between antennular fossa and orbit.

Thoracic sternum glabrous. Sternite 3 (Fig. 6D) subtriangular, anterior margin produced anteriorly with subacute median point, surface slightly depressed medially. Sternite 4 (Fig. 6D) largest, anterior and lateral margins coarsely granular, otherwise with sparse granules and few punctae. Sternites 5–8 becoming smaller toward posterior, surfaces with few punctae. Episternite 4 clearly demarcated from sternite 4; episternites 5–8 each with shallowly concave outer margin. Sternopleonal cavity deep, extending onto posterior part of thoracic sternite 3, margins on sternite 4, corresponding to pleomere 6 and telson, bordered with coarse granules

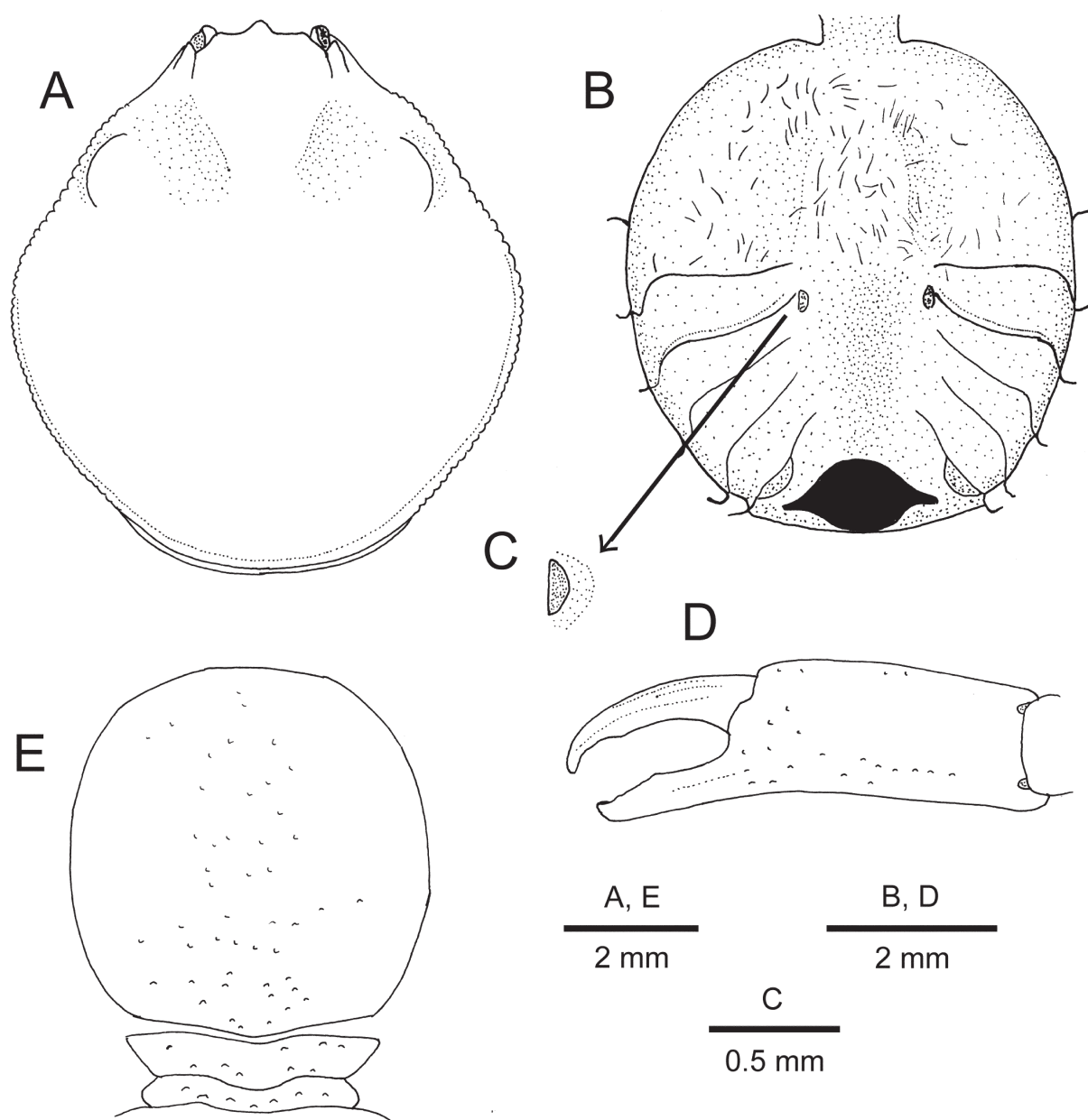
Maxilliped 3 (Fig. 6E) almost flat, outer surface with scattered punctae. Ischium subrectangular, distinctly longer than wide; merus triangular, tapering distally to subacute tip, subequal in length to ischium measured along mesial margin; lateral margin of ischium and merus minutely beaded. Exopod with distal article spatuliform, lateral margin minutely beaded.



**FIGURE 5.** *Pseudophilyra parilis* n. sp., CBM-ZC 14485, holotype, male (7.2×6.2 mm), Mie Prefecture, Japan, habitus in dorsal view (left pereopod 2 missing), stained with methylene blue to show details of dorsal ornamentation of carapace.



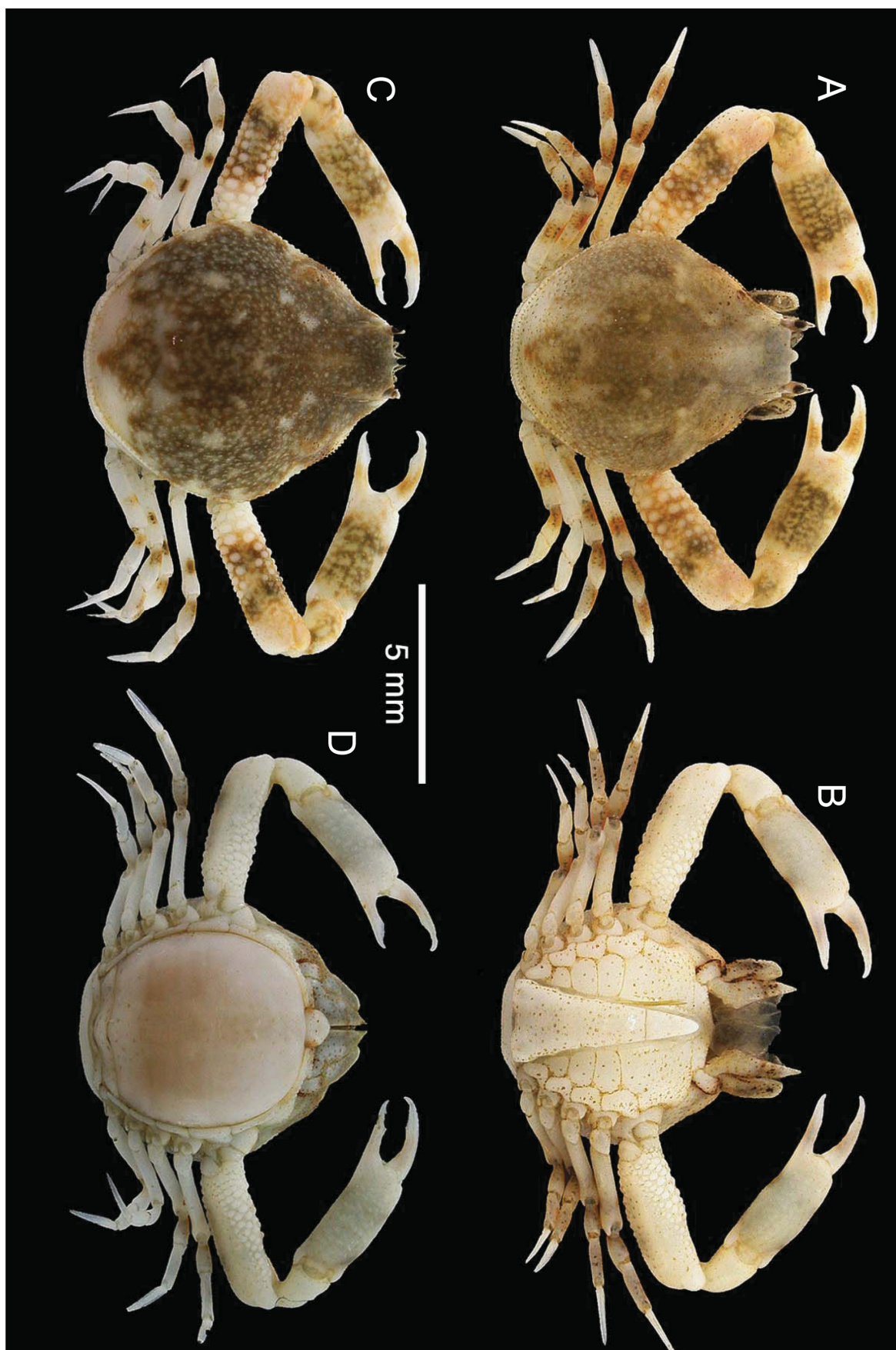
**FIGURE 6.** *Pseudophilyra parilis* n. sp., CBM-ZC 14485, holotype, male (7.2×6.2 mm), Mie Prefecture, Japan. A, carapace, dorsal view (dorsal ornamentation omitted); B, front of carapace and eyes, dorsal view; C, left pterygostomial margin of carapace, dorsal view; D, thoracic sternites 3 and 4, including episternites 4, ventral view; E, left maxilliped 3, outer view (setae omitted); F, right cheliped, dorsal view; G, same, ventral view; H, right pereopod 5, dorsal view; I, pleon and telson, ventral view; J, left gonopod 1, ventral view; K, same, dorsal view; L, left gonopod 2, lateral view.



**FIGURE 7.** *Pseudophilyra parilis* n. sp., CBM-ZC 14486, paratype, female (7.9×7.3 mm), Mie Prefecture, Japan. A, carapace, dorsal view (dorsal ornamentation omitted); B, sternopleonal cavity, ventral view; C, right vulva, ventral view; D, right chela, dorsal view; E, pleon, ventral view (telson broken off).

Chelipeds (Figs. 5, 6F, G) symmetrical, 1.5 times as long as carapace, glabrous. Merus subcylindrical, about 3.0 times as long as wide, covered with pearly granules of various sizes except for distal one-third of upper surface and distal two-thirds of lower surfaces where granules almost absent. Carpus short, cup-shaped, inner surface concave; upper inner margin with row of small granules, but otherwise almost smooth. Palm compressed, 1.9 times as long as wide, slightly sinuous on outer (extensor) margin, inner (flexor) margin also slightly sinuous; upper surface almost smooth, lower surface with scattered punctae; fixed finger weakly deflexed, nearly straight, terminating in slightly curved, blunt tip; dactylus 0.7 times as long as palm, terminating in slightly curved, blunt tip; both occlusal margins meeting in distal half and forming oval hiatus in proximal half, each without conspicuous teeth.





**FIGURE 8.** *Pseudophilyra parilis* n. sp., CBM-ZC 14486, paratypes, male (7.3×6.3 mm) (A, B), female (7.9×7.3 mm) (C, D), showing colour in life. A, C, habitus, dorsal view; B, D, habitus, ventral view.

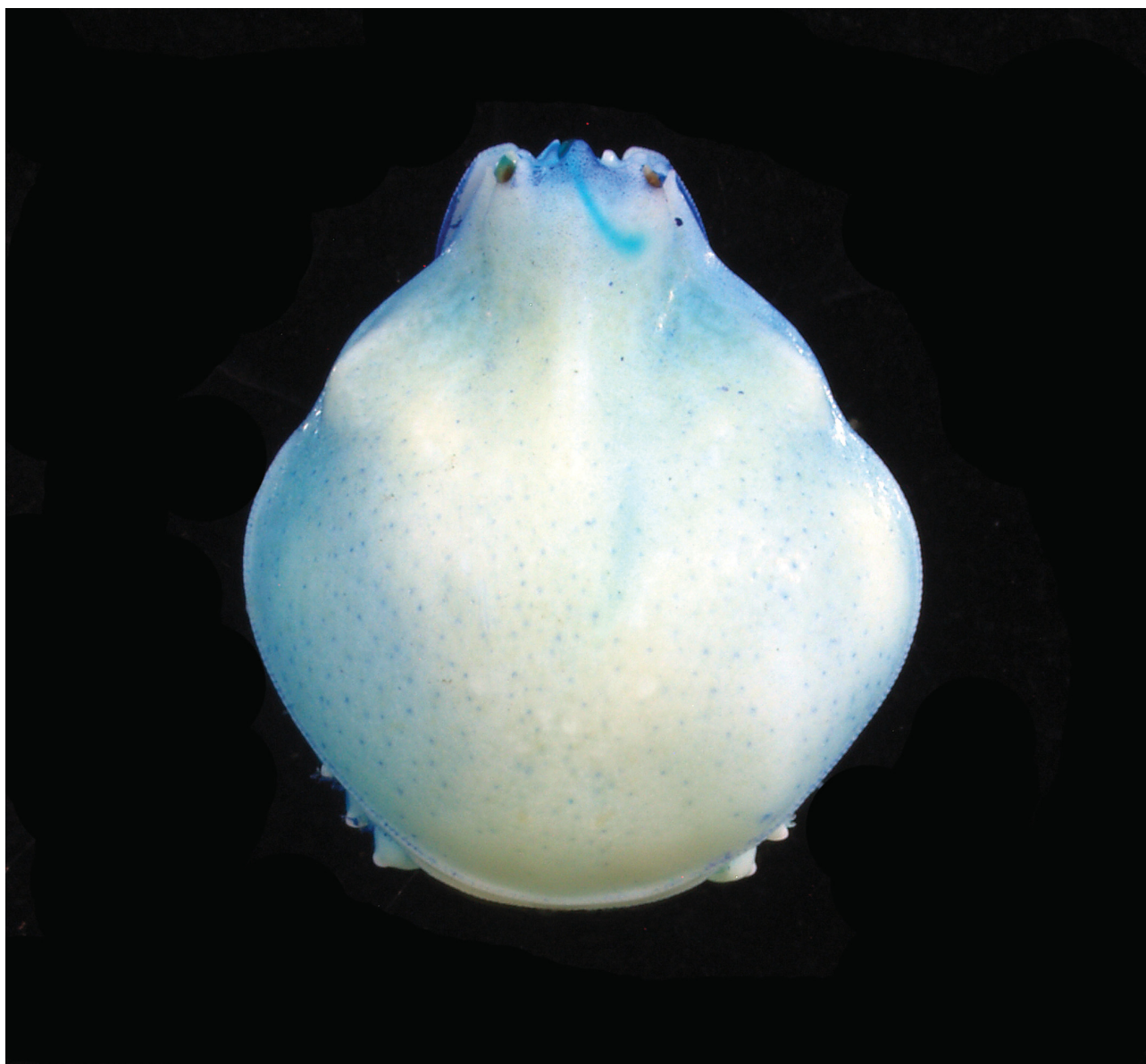


Ambulatory legs (Figs. 5, 6H) slender, glabrous, similar in shape, gradually decreasing in length from first to fourth; each merus cylindrical; each carpus as long as or shorter than propodus; propodus somewhat compressed; each dactylus flattened, slightly curved, tapering distally to minute corneous claw, subequal in length to carpus and propodus combined.

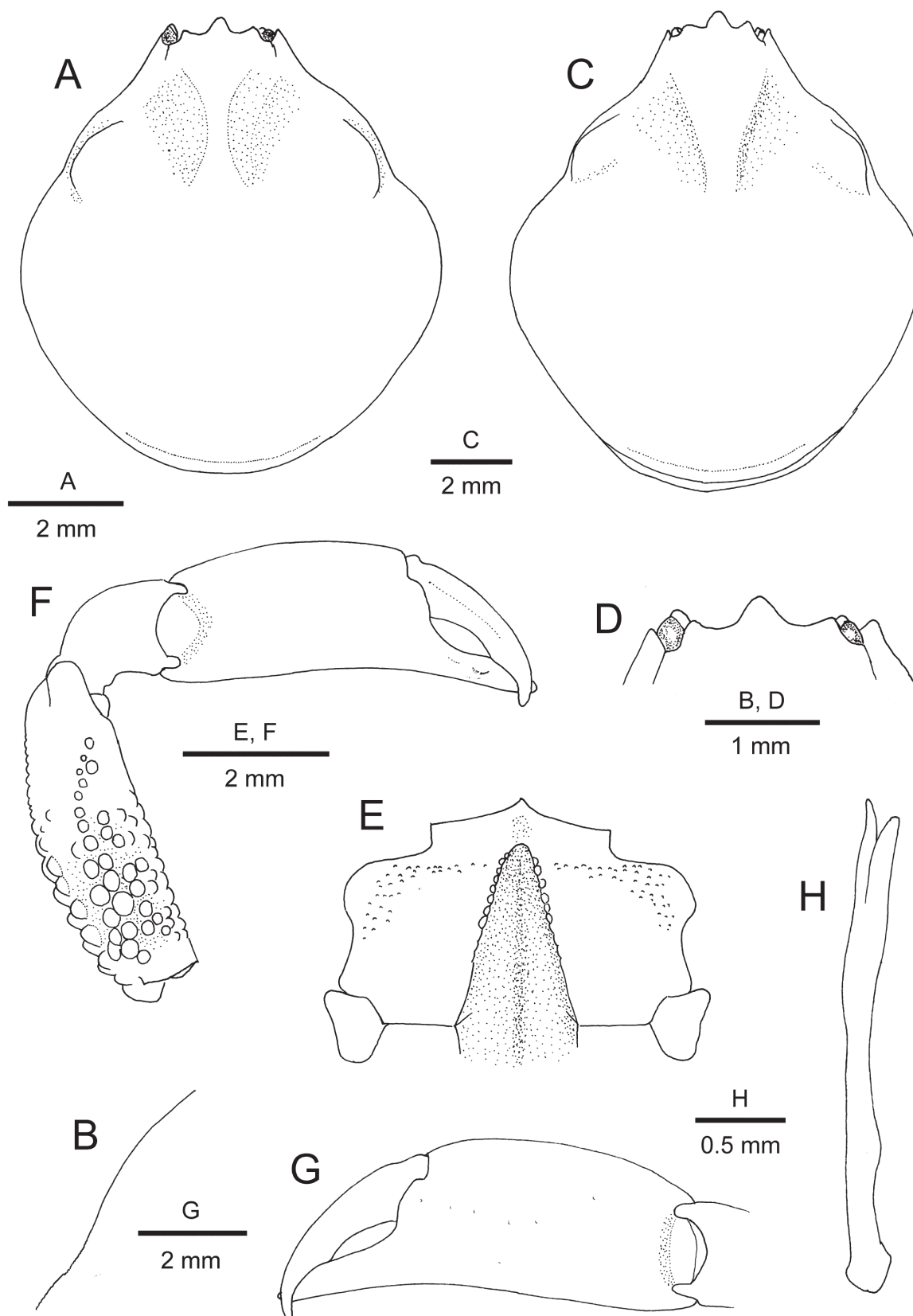
Pleon (Fig. 6I) elongate-triangular, gently curved sternally. Somites 1 and 2 very short, transversely linear. Main fused section consisting of somites 3–6 elongate trapezoidal, outer surface with scattered punctae; trace of suture between somites 4 and 5 still discernible; proximolateral margin of fused somite 3 and 4 slightly expanded, lateral margin with low convexity medially. Somite 6 with trace of median tubercle somewhat proximal to distal margin; lateral margin with low convexity at proximal 0.2. Telson elongate-triangular, 1.9 times as long as wide.

Gonopod 1 (Fig. 6J, K) slender, slightly sinuously curved (distal half nearly straight except for outwardly curved distal part), gradually tapering, reaching nearly to suture between thoracic sternites 3/4, deeply bifurcate at distal 0.3; branches subequal in length, each terminating in acute tip. Gonopod 2 (Fig. 6L) about 0.3 length of gonopod 1, gently curved, proximal part slightly expanded; distal part unequally bilobed, terminal lobe bluntly pointed.

*Paratype males.* Agree well with holotype male. Carapace 1.13–1.15 times as long as wide. Chelipeds 1.4–1.5 times as long as carapace.



**FIGURE 9.** *Pseudophilypira tridentata* Miers, 1879, CBM-ZC 7846, male (6.1×5.3 mm), Okinawa Islands, Ryukyu Islands, Japan, carapace in dorsal view, stained with methylene blue to show details of dorsal ornamentation.



**FIGURE 10.** *Pseudophilyra tridentata* Miers, 1879, CBM-ZC 7846, male (6.1×5.3 mm) (A, B, D–F, H), female (8.1×7.2 mm) (C, G), Okinawa Islands, Ryukyu Islands, Japan. A, C, carapace, dorsal view (dorsal ornamentation omitted); B, left pterygostomial margin, dorsal view; D, front, dorsal view; E, thoracic sternites 3 and 4, including episternites 4; F, left cheliped, dorsal view; G, right chela, dorsal view; H, left gonopod 1, ventral view.

*Female.* Carapace (Fig. 7A) 1.08–1.10 times as long as wide. Front relatively slightly less produced than in males.

Exposed lateral part of thoracic sternum very narrow (Fig. 8D), smooth, forming outer wall of deeply excavated sternopleonal cavity; sutures between sternites 4/5, 5/6, 6/7 and 7/8 distinct; sternites 1–3 fused, deeply depressed below to accommodate telson. Sternopleonal cavity (Fig. 7B) circular in outline, margins distinctly delimited; sutures between sternites 4/5, 5/6, 6/7, and 7/8 widely interrupted medially; median suture absent; sternite 4 large, occupying anterior half of sternopleonal concavity, with scattered short, occasionally feathered, setae. Vulvae (Fig. 7B, C) small, located just posterior to mesial end of suture between sternites 5/6, outline circular, without protrusion on outer margin.

Cheliped slightly slender than that of males, 1.3 times as long as carapace; palm 2.2 times as long as wide; occlusal margins of fingers of cheliped without conspicuous teeth proximal to meeting point (Fig. 7D).

Pleon (Fig. 7E) broad, dome-like; somites 1 and 2 short, transversely band-shaped, somite 2 about twice longer than somite 1; main fused section (somites 3–6) ovoid, no trace of sutures. Telson (damaged in illustrated specimen) small, subsemicircular, exceeding beyond anterior margin of thoracic sternite 3.

**Colour in life.** See Fig. 8. Carapace generally gray or gray-brown, sometimes with irregular blotches of white. Thoracic sternum and pleon entirely white. Cheliped with large gray or gray-brown patches on dorsal surface of merus and palm; fingers with tint of light brown on dorsal surface; ventral surface overall white. Ambulatory legs generally white, with spots of gray or brown on meri, carpi and propodi.

**Distribution.** Presently known only from the type locality, Funakoshi, Daiou-cho, Shima, Mie Prefecture, Japan; intertidal to shallow subtidal sand bottom.

**Remarks.** *Pseudophilyra parilis* **n. sp.** closely resembles *P. punctulata* in the general shape and ornamentation of the carapace, the structure of the cheliped and the deeply bifurcate distal part of the male gonopod 1. The new species differs from *P. punctulata* in the coarser granules bordering the carapace lateral margins (Fig. 6C versus Fig. 3C) and the less curved distal part of the male gonopod 1 (Fig. 6J, K versus Fig. 3I, J). The other potentially useful characters are: in males, the sternite 4 is more strongly granular in *P. parilis* **n. sp.** than in *P. punctulata* (Fig. 6D versus Fig. 3D); the surface of the fused part of the pleon is more strongly punctate in *P. parilis* **n. sp.** than in *P. punctulata* (Fig. 6I versus Fig. 3H); and the outer margin of the female vulva is straight in *P. parilis* **n. sp.**, rather than forming a rounded protrusion in *P. punctulata*.

*Pseudophilyra tridentata* was originally described from Japan on the basis of a female holotype, and has been recorded from various Indo-West Pacific localities (Alcock 1896; Calman 1900; Laurie 1906; Rathbun 1910; Balss 1916, 1922; Stephensen 1946; Tyndale-Biscoe & George 1962; Campbell & Stephenson 1970). Komatsu & Takeda (2000) presented a redescription of the holotype, and clarified that previous records of *P. tridentata* by Sakai (1937, 1976) actually represent *P. intermedia* instead. It is likely that those records outside Japan contain species other than *P. tridentata*. For example, the male first gonopods illustrated by Stephensen (1946) from the Persian Gulf and Tyndale-Biscoe & George (1962) from Australia appear to be different: Stephensen's (1946: fig. 9D) illustration shows a simple distal part, whereas Tyndale-Biscoe & George (1962: 87, fig. 7.6) specifically mentioned that "Distal third divided into two by deep cleft". We examined Japanese specimens undoubtedly identified with *P. tridentata*, as well as the redescription of the holotype by Komatsu & Takeda (2000), for comparison with the new species and *P. punctulata*. Unfortunately, no adult male specimens of *P. tridentata* were available for examination, but in one immature male specimen, although the gonopod 1 was not fully developed, the distal part was already bifurcate. It can thus be assumed that *P. tridentata* also has a distally bifurcate gonopod 1, like *P. parilis* **n. sp.** and *P. punctulata*. Nevertheless, *P. tridentata* differs from the latter two species in many features: the frontal part of the carapace is more strongly produced with a proportionately narrower frontal margin in *P. tridentata* (Fig. 10A, C) than in the latter two species (Figs 3A, 6A); the lateral lobes on the frontal margin are distinctly produced in *P. tridentata* (Fig. 10D) (not produced in *P. punctulata* and *P. parilis* **n. sp.**; Figs. 3B, 6B); the carapace dorsal surface is relatively smoother and less punctate in *P. tridentata* (Fig. 9) than in *P. punctulata* (Fig. 2) and *P. parilis* **n. sp.** (Fig. 5); the mesogastric median ridge and hepatic elevations on the carapace are more prominent in *P. tridentata* (Fig. 10A, C) than in *P. punctulata* (Fig. 3A) and *P. parilis* **n. sp.** (Fig. 6A); the lateral margin of the carapace is nearly smooth or microscopically granular in *P. tridentata* (Fig. 10B), rather than moderately granular (*P. punctulata*; Fig. 3C) or coarsely granular (*P. parilis* **n. sp.**; Fig. 6C); the male thoracic sternite 4 is finely granular anterolaterally in *P. tridentata* (Fig. 10E), whereas it is more coarsely granular in *P. punctulata* (Fig. 3D) and *P. parilis* **n. sp.** (Fig. 6D); and the cheliped palm is more robust in *P. tridentata* (Fig. 10F, G) than in *P. punctulata*

(Figs. 3F, G, 4B) and *P. parilis* **n. sp.** (Figs. 6F, B, 7B) (1.8 times as long as wide in *P. tridentata* versus 2.0–2.2 times as long as wide in the latter two species). Furthermore, *P. tridentata* seems to be restricted to subtidal depths below 40 m, whereas *P. punctulata* and *P. parilis* **n. sp.** occur in intertidal to shallow subtidal depths.

It may be interesting to mention that the episternites 4 are partially fused to the thoracic sternite 4 in the adult male of *P. punctulata* (Fig. 3D), whereas they are fully separated from the thoracic sternite 4 in the adult males of *P. parilis* **n. sp.** (Fig. 6D). The significance of this character should be reassessed when more adult male specimens become available for examination.

**Etymology.** From the Latin “*parilis*” (adj., similar), in reference to the close similarity of the new species to *Pseudophilyra punctulata*.

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